UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/822,211	04/02/2001	Hiromoto Ohno	Q60006	9864

7590 10/16/2003

SUGHRUE, MION, ZINN, MACPEAK & SEAS, PLLC
2100 Pennsylvania Avenue, N.W.
Washington, DC 20037-3202

EXAMINER	
COLE, MONIQUE T	

ART UNIT	PAPER NUMBER
1743	6

DATE MAILED: 10/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/822,211	OHNO ET AL.	
	Examiner	Art Unit	
	Monique T. Cole	1743	

-- The MAILING DATE of this communicati n appears on the cover sheet with the correspondence address --

Peri d for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 April 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-38* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *1-38* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-12 & 23-26, drawn to a method/apparatus for measuring a halogen concentration, classified in class 436, subclass 124.

II. Claims 29-34, drawn to a process for producing a halogen compound, classified in class 570, subclass 101+.

III. Claims 13-22, 27 & 28, drawn to method/apparatus, classified in class 436, subclass 124.

IV. Claims 35-38, drawn to process for producing a perfluorocarbon, classified in class 570, subclass 101+.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions Group I and Group II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product (method for measuring a halogen concentration/apparatus) can be made by another materially different process that does not require the halogen to be made as specified in Group II. See for instance related art JP 63-247655.

3. Inventions Group I and Group III are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different modes of

operation, different functions, or different effects (MPEP § 806.04, MPEP § 808.01). In the instant case the different inventions are not disclosed as capable of use together and they have different modes of operation.

4. Inventions Group I and Group IV are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different modes of operation, different functions, or different effects (MPEP § 806.04, MPEP § 808.01). In the instant case the different inventions are not disclosed as capable of use together and they have different modes of operation.

5. Inventions Group II and Group III are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different modes of operation, different functions, or different effects (MPEP § 806.04, MPEP § 808.01). In the instant case the different inventions are not disclosed as capable of use together and they have different modes of operation.

6. Inventions Group II and Group IV are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different modes of operation, different functions, or different effects (MPEP § 806.04, MPEP § 808.01). In the instant case the different inventions are not disclosed as capable of use together and they have different modes of operation.

7. Inventions Group III and Group IV are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as

claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product (method for measuring a perfluorocarbon concentration/apparatus) can be made by another materially different process that does not require the halogen to be made as specified in Group II. See for instance related art JP 63-27736.

8. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

9. A telephone call was made to Bruce Kramer on October 8, 2003 to request an oral election to the above restriction requirement, but did not result in an election being made.

Applicant is advised that the reply to this requirement to be complete must include an election of the invention to be examined even though the requirement be traversed (37 CFR 1.143).

10. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Monique T. Cole whose telephone number is 703-305-0447. The examiner can normally be reached on Monday-Thursday from 6:30 A.M. to 4:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on 703-308-4037. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-0661.

Monique T. Cole
Examiner
Art Unit 1743

MC

Restriction

restrict one meth of making halogen compound dm. 29-34

WHAT IS CLAIMED IS:

1. A method for measuring a halogen concentration comprising: introducing a gas containing a halogen gas into a metal iodide-containing solution to liberate iodine; and determining quantitatively the liberated iodine by measuring a visible light transmittance of the solution at a specific wavelength.

missing additional step – how does iodine amt. relate to halogen concentration

2. The method for measuring a halogen concentration according to claim 1, wherein the metal iodide-containing solution contains starch.

3. The method for measuring a halogen concentration according to claim 1, wherein the specific wavelength ranges from 460 nm to 520 nm.

4. The method for measuring a halogen concentration according to claim 2, wherein the specific wavelength ranges from 580 nm to 780 nm.

5. The method for measuring a halogen concentration according to claim 3 or 4, wherein the visible light is a laser beam.

6. The method for measuring a halogen concentration according to claim 1 or 2, wherein the halogen gas is chlorine gas or fluorine gas.

7. A method for continuously measuring a halogen concentration, comprising: introducing continuously a gas containing a halogen gas into a continuously flowing metal iodide-containing solution to liberate iodine; and determining quantitatively the liberated iodine by measuring a visible light transmittance of the solution at a specific wavelength.

missing step; see claim 1

8. The method for continuously measuring a halogen concentration according to claim 7, wherein the metal iodide-containing solution contains starch.

9. The method for continuously measuring a halogen concentration according to claim 7, wherein the specific wavelength ranges from 460 nm to 520 nm.

10. The method for continuously measuring a halogen concentration

according to claim 8, wherein the specific wavelength ranges from 580 nm to 780 nm.

11. The method for continuously measuring a halogen concentration according to claim 9 or 10, wherein the visible light is a laser beam.

12. The method for continuously measuring a halogen concentration according to claim 7 or 8, wherein the halogen gas is chlorine gas or fluorine gas.

13. A method for measuring a hydrofluorocarbon concentration, comprising measuring a concentration of at least one kind of hydrofluorocarbon in a gas mixture by infrared spectrometry.

Restrict out 13-22, 27-28, 35-38

14. The method for measuring a hydrofluorocarbon concentration according to claim 13, wherein the hydrofluorocarbon concentration is not higher than 8 mole%.

15. The method for measuring a hydrofluorocarbon concentration according to claim 13 or 14, wherein the gas mixture contains a perfluorocarbon, and hydrogen fluoride and/or fluorine, and the concentrations of the perfluorocarbon and/or the hydrogen fluoride are measured simultaneously by infrared spectroscopy.

16. The method for measuring a hydrofluorocarbon concentration according to claim 15, wherein the gas mixture is rich in the perfluorocarbon and/or the hydrogen fluoride.

17. The method for measuring a hydrofluorocarbon concentration according to claim 13, wherein condensation of a gas on a surface of a measurement cell is prevented by heating the measurement cell.

18. The method for measuring a hydrofluorocarbon concentration according to claim 17, wherein hydrogen fluoride gas is removed after the gas concentration measurement by introducing a purge gas into the heated measurement cell.

19. The method for measuring a hydrofluorocarbon concentration according to claim 13, wherein the hydrofluorocarbon is represented by General Formula (1):

$$C_xH_yF_z \qquad (1)$$

where x, y, and z are respectively an integer satisfying the relations: $1 \leqq x \leqq 3$, $1 \leqq y \leqq 4$, $1 \leqq z \leqq 7$, and $2x+2 = y+z$.

20. The method for measuring a hydrofluorocarbon concentration according to claim 13, wherein the hydrofluorocarbon is trifluoromethane, 1,1,1,2-tetrafluoroethane and/or pentafluoroethane, and the concentration thereof is measured respectively at a wavenumber ranging from 2900 cm^{-1} to 3100 cm^{-1} as the measurement wavenumber.

21. The method for measuring a hydrofluorocarbon concentration according to claim 15, wherein the perfluorocarbon is tetrafluoromethane and/or hexafluoroethane, and the concentration thereof is measured respectively at a wavenumber ranging from 1000 cm^{-1} to 2700 cm^{-1} as the measurement wavenumber.

22. The method for measuring a hydrofluorocarbon concentration according to claim 15, wherein the concentration of hydrogen fluoride in the gas mixture is measured at a wavenumber ranging from 3600 cm^{-1} to 4300 cm^{-1} as the measurement wavenumber.

23. A measurement apparatus for continuously measuring a halogen concentration for use in the continuous measurement of a halogen concentration according to claim 7, comprising a reaction section for liberating iodine; a liquid feed pump for introducing a metal iodide-containing solution into the reaction section; an introduction tube for sampling a part of a reaction gas containing a halogen gas from a halogen compound production line; a gas flow rate controller connected to the introduction tube and serving to introduce continuously the

halogen-containing gas into the reaction section; a gas-liquid separation section for separating an undissolved gas; a measurement section equipped with a visible light source for emitting visible light for measurement of iodine liberated in the reaction section, and a detector for measuring a transmittance of the visible light; and a data processing section.

24. A measurement apparatus for continuously measuring a halogen concentration for use in the continuous measurement of a halogen concentration according to claim 8, comprising a reaction section for liberating iodine; a liquid feed pump for introducing a solution containing a metal iodide and starch into the reaction section; an introduction tube for sampling a part of a reaction gas containing a halogen gas from a halogen compound production line; a gas flow rate controller connected to the introduction tube and serving to introduce continuously the halogen-containing gas into the reaction section; a gas-liquid separation section for separating an undissolved gas; a measurement section equipped with a visible light source for emitting visible light for measurement of iodine liberated in the reaction section, and a detector for measuring a transmittance of the visible light; and a data processing section.

25. The measurement apparatus for continuously measuring a halogen concentration according to claim 23 or 24, wherein the visible light source is a laser device.

26. The measurement apparatus for continuously measuring a halogen concentration according to claim 25, wherein the laser device is a semiconductor laser device.

27. An apparatus for measuring a hydorfluorocarbon concentration for the method for measuring a hydrofluorocarbon concentration in a gas mixture according to claim 13, comprising a measurement cell equipped with a heating means; an introduction tube for sampling a part of a

reaction gas from a perfluorocarbon production line; automatic switching valve connected with the introduction tube and a purge gas introduction tube for controlling and switching quantity of introduction of the reaction gas and a purge gas into the measurement cells; an infrared spectrometer; and a data processing device having a calibration curve installed therein.

28. The apparatus for measuring a hydorfluorocarbon concentration according to claim 27, wherein the measurement cell has an optical window made from calcium fluoride for transmitting infrared ray.

29. A process for producing a halogen compound by reaction of an organic compound with a halogen gas in a gas phase, wherein the halogen concentration is adjusted by the method for continuously measuring a halogen concentration as set forth in claim 7.

30. The process for producing a halogen compound according to claim 29, wherein the halogen gas is chlorine gas or fluorine gas.

31. The process for producing a halogen compound according to claim 29 or 30, wherein the organic compound is at least one hydrofluorocarbon represented by General Formula (2):

$$C_aH_bF_c \qquad (2)$$

where a, b, and c are respectively an integer satisfying the relations: $1 \leqq a \leqq 3$, $1 \leqq b \leqq 4$, $1 \leqq c \leqq 7$; and $b+c = 4$ for $a=1$, $b+c = 6$ for $a=2$, and $b+c = 8$ for $a=3$;

and/or at least one fluoroolefin represented by General Formula (3):

$$C_dH_eF_f \qquad (3)$$

where d, e, and f are respectively an integer satisfying the relations: $2 \leqq d \leqq 3$, $0 \leqq e \leqq 5$, $1 \leqq f \leqq 6$; and $e+f = 4$ for $d=2$, and $e+f = 6$ for $d=3$.

32. The process for producing a halogen compound according to claim 31, wherein the hydrofluorocarbon is at least one selected from the group consisting of trifluoromethane, 1,1,1,2-tetrafluoroethane,

pentafluoroethane, hexafluoropropane, and heptafluoropropane.

33. The process for producing a halogen compound according to claim 31, wherein the fluoroolefin is at least one selected from the group consisting of tetrafluoroethylene, trifluoroethylene, and hexafluoropropene.

34. The process for producing a halogen compound according to claim 30, wherein the concentration of the fluorine gas is controlled to be not higher than the explosion range thereof.

35. A process for producing a perfluorocarbon by reacting a hydrofluorocarbon with fluorine gas in a gas phase, wherein the concentration of the hydrofluorocarbon is controlled by the method for measuring a hydrofluorocarbon concentration as set forth in claim 13.

36. The process for producing a perfluorocarbon according to claim 35, wherein the concentration of the hydrofluorocarbon is controlled to be not higher than 8 mole%.

37. The process for producing a perfluorocarbon according to claim 35 or 36, wherein the hydrofluorocarbon is represented by General Formula (1):

$$C_xH_yF_z \qquad (1)$$

where x, y, and z are respectively an integer satisfying the relations: $1 \leqq x \leqq 3$, $1 \leqq y \leqq 4$, $1 \leqq z \leqq 7$, and $2x+2 = y+z$.

38. The process for producing a perfluorocarbon according to claim 37, wherein the hydrofluorocarbon is at least one selected from the group consisting of trifluoromethane, 1,1,1,2-tetrafluoroethane, and pentafluoroethane.